

DSC-02002

REMARKS

Claims 1-38 are pending in the present application Claims 1, 11, and 25 have been amended, leaving Claims 1 - 38 for consideration upon entry of the present Amendment.

Claim rejections under 35 U.S.C. § 103(a)

Claims 1, 4, 7-10, 11, 16-17, 22, 25, 29, 36 stand rejected under 35 U.S.C. § 103(a) as being obvious in view of U.S. Patent 4,910,962 to Vanzo in further view of U.S. Patent 4,253,428 to Billings et al. Applicants respectfully traverse this rejection.

Independent Claim 1 is directed to a method for generating electricity comprising, *inter alia*, “removing liquid hydrogen from a first location in the storage tank”, “capturing boiled off hydrogen gas from a second location in the storage tank”, “storing the captured hydrogen gas” and “fueling a hydrogen conversion device with the captured hydrogen gas.”

Vanzo teaches of a system for generating electricity in a first location, converting the electricity into liquid hydrogen which is transported to a second location where the liquid hydrogen converted back into electricity. The system taught by Vanzo includes a storage tank 26 (railroad car), which holds the liquid hydrogen. The liquid hydrogen is withdrawn from the tank 26 through a buffer tank 26D and into a vaporizer 46. In the vaporizer, the liquid hydrogen is converted into vapor which is used to fuel a boiler.

Billings et al. teaches of a hydrogen fueled internal combustion engine where the hydrogen is stored in a metal hydride containers. The hydrogen is stored and released from the hydride container by cooling and heating the hydride material respectively. A pressure relief valve is located in the hydrogen supply line between the hydride storage container and the internal combustion engine to prevent over pressurization of the supply line.

Applicants respectfully submit that independent Claim 1, as amended is not anticipated, nor is obvious in view of Vanzo in further view of Billings. In Claim 1, Applicants claim requires that liquid hydrogen be removed from a first location in the storage tank and that boiled off hydrogen gas is captured from a second location in the same storage tank. The Applicants claim further requires that the captured boiled off gas be used as a fuel to generate electricity.

In order for a claim to be obvious, it must be shown through one or more references that were available to the inventor and that teach the subject matter.

DSC-02002

Additionally, there needs to be a suggestion to combine or modify the references and the combination or modification of which would appear to be sufficient to have made the claimed invention obvious to one of ordinary skill in the art. Applicant respectfully asserts that the combination of Vanzo and Billings et al. fail to satisfy this requirement.

In contrast to Applicant's Claim 1, Vanzo teaches of a system having a storage tank which receives liquid hydrogen from a first inlet and withdraws liquid hydrogen through a second outlet. Additionally, Billings et al. teaches of a system using a hydride storage system. Application respectfully disagrees with the Examiner's assertion that Billings teaches a storage tank having a liquid coming out of one end and a gas out of the other. While the Examiner correctly states that the pressure relief valve of Billings will effectively control the pressure of the tank, the liquid which Examiner refers to is not liquid hydrogen, but rather a coolant (Column 5, lines 55-64). This coolant is in aiding the storage or release of hydrogen from the hydride material in the storage tank. Applicant respectfully submits that the combination of the pressure relief valve of Billings with the storage tank of Vanzo would result not in Applicant's Claim 1. Applicant's Claim 1 as amended requires that liquid hydrogen be removed from a first location and the hydrogen gas be captured from a second location in the storage tank. Claim 1 further requires that the captured hydrogen gas be used as a fuel to generate electricity. Applicant respectfully submits that in light of the misreading of the Billings et al. storage tank, there is no suggestion, inference or motivation in either of the references to be combined or modified in this manner. Therefore, applicants submit that Claim 1 patentably defines over Vanzo in view of Billings et al. Accordingly, reconsideration and allowance of Claim 1 is respectfully requested.

For the same reasons set forth above with respect to Claim 1, Applicant respectfully submits that the rejections of independent Claims 11, 16, 25, 29 and 36 are improper. Therefore, Applicants submit that independent Claims 11 and 25 are patentably defined over Vanzo in view of Billings et al. Moreover, Claims 4, 7-10, 17, and 22 which depend either directly or indirectly from independent Claims 1, 11 and 16 also patentably define over Vanzo in view of Billings et al. Accordingly, reconsideration and allowance of claims 4, 7-10, 11, 16-17, 22, 25, 29, 36 are respectfully requested.

DSC-02002

Claims 2, 12, 26 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,910,962 to Vanzo in view of U.S. Patent 5,375,580 to Stolz et al.

Stolz et al. teaches of a locomotive powered by refrigerated liquefied methane ("RLM"). The system taught by Stolz includes a number of heat exchanger loops to allow selective heating and/or cooling of different components such as the compressed intake air and the fuel gas vaporizer. RLM from tank 18 passes through the vaporizer 6 in preparation for use as a fuel in the engine 2. To vaporize the RLM, Stolz utilized a heat exchange fluid (Column 5, lines 20-53) to transport heat from the intake combustion air to the vaporizer 6. The system further includes a storage tank 11 for the heat exchange fluid, which is preferably a ethylene-glycol-water solution.

Claim 2 which depends indirectly from independent Claim 1 and incorporates all of the limitations of Claim 1 requires that liquid hydrogen be removed from a first location in a storage tank, boiled off hydrogen gas be captured from a second location in a storage tank, stored and used to fuel a hydrogen conversion device that generates electricity. Claim 2 adds a further requirement that the hydrogen conversion device be an internal combustion engine. For reasons set forth above with respect to Claim 1, Applicant respectfully submits that neither Vanzo nor Stolz et al. teach or suggest the method for generating electricity as claimed in Claim 2. Applicant respectfully submits that, at best, if Vanzo and Stolz et al. were combined, the internal combustion engine taught by Stolz et al. would fueled by liquid hydrogen removed from a storage tank and vaporized into gas as taught by Vanzo. Therefore, applicants submit that Claim 2 patentably defines over Vanzo in view of Stolz et al. Accordingly, reconsideration and allowance of Claim 2 is respectfully requested.

For the same reasons set forth above with respect to Claim 2, Applicant respectfully submits that the rejections of Claims 12, 26, and 27 are also improper. Therefore, applicants submit that Claims 12, 26, and 27 are patentably defined over Vanzo in view of Stolz et al. Accordingly, reconsideration and allowance of Claims 12, 26 and 27 is respectfully requested.

DSC-02002

Claims 3, 5-6, and 14-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,910,962 to Vanzo in view of U.S. Patent 6,543,229 to Johansson.

Claims 3 and 5-6 which depend directly or indirectly from independent Claim 1 and incorporate all of the limitations of Claim 1 which requires that liquid hydrogen be removed from a first location in a storage tank, boiled off hydrogen gas be captured from a second location in a storage tank, stored and used to fuel a hydrogen conversion device that generates electricity. Claims 3 and 5-6 add a further requirement that waste heat be collected (Claim 3, 6) and the hydrogen conversion device be a stirling engine (Claim 5). For reasons set forth above with respect to Claim 1, Applicant respectfully submits that neither Vanzo nor Johansson teach or suggest the method for generating electricity as claimed in Claims 3 and 5-6. Applicant respectfully submits that, at best, if Vanzo and Johansson were combined, the Stirling engine taught by Johansson would be fueled by liquid hydrogen removed from a storage tank and vaporized into gas as taught by Vanzo. Therefore, applicants submit that Claim 3 and 5-6 patentably defines over Vanzo in view of Johansson. Accordingly, reconsideration and allowance of Claim 3 and 5-6 is respectfully requested.

For the same reasons set forth above with respect to Claim 3 and 5-6, Applicant respectfully submits that the rejections of Claims 14 and 15 are also improper. Therefore, applicants submit that Claims 14 and 15 are patentably defined over Vanzo in view of Johansson. Accordingly, reconsideration and allowance of Claims 14 and 15 is respectfully requested.

Claims 18-19, 30-31, 37-38 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,910,962 to Vanzo in view of U.S. Patent 4,253,428 to Billings et al. in further view of U.S. Patent 5,375,580 to Stolz et al.

For the same reasons set forth above with respect to Claim 16, Applicant respectfully submits that the rejections of Claims 18-19, 30-31, 37-38 which depend either directly or indirectly from Independent Claims 16, 29 and 36 are also improper. Applicant respectfully submits that neither Vanzo, Billings et al., nor Stolz et al. teach or suggest the method for generating electricity as claimed in Claim 16 as amended. Applicant respectfully submits that, at best, if Vanzo, Billings et al., and Stolz et al. were

DSC-02002

combined, the internal combustion engine taught by Stolz et al. would be fueled by liquid hydrogen removed from a storage tank and vaporized into gas as taught by Vanzo. Therefore, applicants submit that Claims 18-19, 30-31, 37-38 are patentably defined over Vanzo in view of Billings et al. in further view of Stolz et al. Accordingly, reconsideration and allowance of Claims 18-19, 30-31, 37-38 is respectfully requested.

Claims 20-21 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,910,962 to Vanzo in view of U.S. Patent 4,253,428 to Billings et al. in further view of U.S. Patent 6,543,229 to Johansson.

For the same reasons set forth above with respect to Claim 16, Applicant respectfully submits that the rejections of Claims 20-21 and 28 which depend either directly or indirectly from Independent Claim 16 are also improper. Applicant respectfully submits that neither Vanzo, Billings et al., nor Johansson teach or suggest the method for generating electricity as claimed in Claim 16 as amended. Applicant respectfully submits that, at best, if Vanzo, Billings et al., and Johansson were combined, the Stirling engine taught by Johansson would be fueled by liquid hydrogen removed from a storage tank and vaporized into gas as taught by Vanzo. Therefore, applicants submit that Claims 20-21 and 28 are patentably defined over Vanzo in view of Billings et al. in further view of Johansson. Accordingly, reconsideration and allowance of Claims 20-21 and 28 is respectfully requested.

Claims 23-24 and 32-35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,910,962 to Vanzo in view of U.S. Patent 4,253,428 to Billings et al. in further view of U.S. Patent 5,003,772 to Huber.

For the same reasons set forth above with respect to Claim 16, Applicant respectfully submits that the rejections of Claims 23-24 which depend either directly or indirectly from Independent Claim 16 are also improper. Applicant respectfully submits that neither Vanzo, Billings et al., nor Huber teach or suggest the method for generating electricity as claimed in Claim 16 as amended. Applicant respectfully submits that, at best, if Vanzo, Billings et al., and Huber were combined, the internal combustion engine taught by Billings et al. would be fueled by liquid hydrogen pumped by Huber and subsequently vaporized into a gas as taught by Vanzo. Therefore, applicants submit that

DSC-02002

Claims 23-24 are patentably defined over Vanzo in view of Billings et al in further view of Huber. Accordingly, reconsideration and allowance of Claims 23-24 is respectfully requested.

Claim 33 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,910,962 to Vanzo in view of U.S. Patent 4,253,428 to Billings et al. in further view of U.S. Patent 5,003,772 to Huber in further view of Stoltz et al.

For the same reasons set forth above with respect to Claim 32, Applicant respectfully submits that the rejections of Claim 33 which depends directly from Independent Claim 32 is also improper. Applicant respectfully submits that neither Vanzo, Billings et al., Huber, Stoltz et al. teach or suggest the method for generating electricity as claimed in Claim 33. Applicant respectfully submits that, at best, if Vanzo, Billings et al., and Huber were combined, the internal combustion engine taught by Stoltz et al. would be fueled by vaporized gas pumped by Huber and created from liquid hydrogen as taught by Vanzo. Therefore, applicants submit that Claim 33 is patentably defined over Vanzo in view of Billings et al in further view of Huber in further view of Stoltz et al. Accordingly, reconsideration and allowance of Claim 33 is respectfully requested.

DSC-02002

Conclusion

For at least the foregoing reasons, it is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly reconsideration and allowance is respectfully requested and that action is earnestly solicited.

The Commissioner is hereby authorized to charge any additional fees which may be required for this amendment, or credit any overpayment, to Deposit Account No. 503125.

In the event that an extension of time is required, or may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account 503125.

Respectfully submitted,

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